AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Currently Amended) A spectrometer for analysing a sample produced by an inductively coupled plasma torch in which a ~~normal~~ plasma is created in a tube of the spectrometer by application of gas to the torch and activation of an induction coil to heat the gas and therefore produce the ~~normal~~ plasma, wherein the ~~normal~~ plasma is constrained within the tube, is separated from the tube and is capable of collapsing into a toroidal plasma, the spectrometer comprising:

a detector for ~~detecting a change in the plasma from~~ monitoring the ~~normal~~ plasma ~~to the toroidal plasma~~; and

a control section for receiving a signal from the detector and for determining ~~a change of~~ from said signal that the plasma ~~from the normal plasma to~~ has collapsed into the toroidal ~~plasma; and~~ plasma, wherein the control section ~~being~~ is configured to shut down the torch when the control section determines that the plasma ~~changes from the normal plasma to~~ has collapsed into the toroidal plasma.

2. (Currently Amended) The spectrometer of claim 1 wherein the detector comprises an optical detector which is directed at a position at which the top region or tail of the ~~normal~~ plasma will exist, so that ~~if~~ when the ~~normal~~ plasma collapses into ~~a~~ the toroidal plasma, ~~the position of the plasma changes rapidly and~~ the light intensity falling on the optical detector falls, thereby changing the signal produced by the optical detector so that the control section can ~~recognise~~ determine that the ~~change in~~ plasma ~~shape~~ has ~~occurred~~collapsed.

3. (Currently Amended) The spectrometer of claim 1, wherein the detector is provided with a collimator and/or a lens for increasing the ratio of light received by the detector

when the ~~normal~~ plasma is in existence, compared to the light received by the detector when the toroidal plasma is in existence.

4. (Previously Presented) The spectrometer of claim 1 comprising an optical fibre or fibres or solid waveguide arranged to conduct light to the detector.

5. (Previously Presented) The spectrometer of claim 3, wherein the detector is a photodiode.

6. (Previously Presented) The spectrometer of claim 1 wherein the detector is an electronic camera with suitable software to analyse the image of the plasma and determine its shape and position to thereby determine if the plasma has collapsed to the toroidal plasma.

7. (Original) The spectrometer of claim 1 wherein the detector is a pixel array.

8. (Original) The spectrometer of claim 7 wherein the array is a linear photodiode array and the linear photodiode array is provided with a lens.

9. (Currently Amended) The spectrometer of claim 1 wherein the induction coil includes a generator for generating power to be supplied to the coil to activate the coil, and the control section is adapted to shut down the torch by switching off the generator when the control section determines the change of shape from the ~~normal~~ plasma to the toroidal plasma.

10. (Currently Amended) The spectrometer of claim 1 wherein the detector is for determining the impedance value of the plasma in order to determine the change from the ~~normal~~ plasma to the toroidal plasma.

11. (Previously Presented) The spectrometer of claim 10 wherein the induction coil includes a generator for generating power to be supplied to the coil to activate the coil, and the impedance value is provided by measuring the voltage and current of a high voltage DC supply which feeds the generator.

12. (Previously Presented) The spectrometer of claim 1 wherein the detector is a photodiode.

13. (Previously Presented) The spectrometer of claim 2 wherein the detector is a photodiode.

14. (Currently Amended) A method of controlling a plasma torch spectrometer, comprising:

producing a ~~normal~~ plasma in a tube of the spectrometer by application of gas to an inductively coupled plasma torch and activation of an induction coil to heat the gas, wherein the ~~normal~~ plasma is constrained within the tube, is separated from the tube and is capable of collapsing into a toroidal plasma;

a detector detecting a ~~change in the~~ collapse of the plasma ~~from the normal plasma to the~~ into the toroidal plasma;

receiving a signal from the detector at a control section;

determining with the control section ~~the change in the~~ that said plasma ~~from the normal plasma to~~ has collapsed into the toroidal plasma; and

said control section responding to determining that said plasma has collapsed into the toroidal plasma by shutting down said torch ~~with said control section when said control section determines that the plasma changes from the normal plasma to the toroidal plasma~~.

15. (New) The method of claim 14, further comprising:

directing said detector at the top region or tail of the plasma;

monitoring said plasma with the detector for a fall in light intensity due to the plasma collapsing into the toroidal plasma; and

determining that the plasma has collapsed with said control section from a change in the signal produced by the detector due to said fall in light intensity, wherein the detector comprises an optical detector.